Progress Report: Data Collection and Analysis Report and Revised Problem Hypothesis

Date: **May 2006**

Listed Waterbody: **San Lorenzo River**

Listed Condition: **Pathogens**

Designated Beneficial Uses: Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Industrial Service Supply (IND), Ground Water Recharge (GWR), Contact and Non-contact Recreation (REC-1 and REC-2), Wildlife Habitat (WILD), Cold Freshwater Habitat (COLD), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Rare, Threatened, or Endangered Species (RARE), Preservation of Biological Habitats of Special Significance (BIOL), Freshwater Replacement (FRSH), and Commercial and Sport Fishing (COMM)

Watershed Location: Santa Cruz County, drains into San Lorenzo River Estuary and ocean

Year added to California's CWA Section 303(d) List of Impaired Waters - 1994

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Basis for listing: San Lorenzo River was listed in 1994 for pathogens. The exact data and/or reports used to list this waterbody are unknown, however, data taken by the County of Santa Cruz from 1985 to 1994 do show exceedences of the Basin Plan's bacterial water quality objective[1] for contact recreation from several sampling sites of the San Lorenzo River.

Data Collection and Analysis:

During the Jan. 2004 – Feb. 2005 time period, staff concluded that the San Lorenzo River was attaining bacterial water quality objectives based on data Santa Cruz County collected. Staff requested data from the County for the Feb. 2005 – Jan. 2006 time period and found the following (years are listed side by side for ease of comparison):

[1] REC-1:"Fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, shall not exceed a log mean of 200/100 ml, nor shall more than ten percent of total samples during any 30-day period exceed 400/100 ml."

SLR @ River Street (245)	Data collection time period	
	Jan. 2004 – Feb. 2005	Feb. 2005 – Jan. 2006
Total number of samples	63	51
Total samples that exceed 400 MPN/100 mL	5	4
% exceedence of 400 MPN	8%	8%
Highest exceedence	3100	1570
Geometric mean of all samples	145	161

Comparing the bacterial concentrations on a yearly basis, staff found that SLR @ River St. is still attaining bacterial water quality objectives. However, if we look at the data month by month, we see that there were exceedences of the 400 MPN objective in May, July and November 2005. Comparing the yearly geometric mean with the previous year (Jan. 2004 – Feb. 2005), we see that the numbers are very similar. Therefore, it appears that the water quality is very similar in 2004 as compared to 2005. Even though there were some exceedences, staff concludes that they were low in frequency and in concentration.

SLR Above Love Creek (180)	Data collection time period	
	Jan. 2004 – Feb. 2005	Feb. 2005 – Jan. 2006
Total number of samples	58	48
Total samples that exceed 400 MPN/100 mL	5	7
% exceedence of 400 MPN	9%	15%
Highest exceedence	2000	1320
Geometric mean of all samples	106	116

Comparing the bacterial concentrations on a yearly basis, staff found that SLR Above Love Creek does not attain bacterial water quality objectives (15% exceedence over the course of a year). Exceedences occurred in Feb., March, May, Aug., Nov. and Dec. 2005. Although the site exceeds the 400 MPN more than 10% of the time, we see that the numbers are very similar to the previous year. The highest exceedence in 2005 was lower than in 2004 and the geometric means are very similar both years. Therefore, it appears that the water quality is very similar in 2004 as compared to 2005. Even though this station exceeds the 10% of 400 MPN during the year 2005, staff concludes that the number of exceedences are still fairly low and the concentrations that do exceed the 400 MPN are not extremely elevated.

SLR @ Big Trees (060)	Data collection time period	
	Jan. 2004 – Feb. 2005	Feb. 2005 – Jan. 2006
Total number of samples	63	49
Total samples that exceed 400 MPN/100 mL	5	7
% exceedence of 400 MPN	8%	14%
Highest exceedence	3492	1530
Geometric mean of all samples	138	160

Comparing the bacterial concentrations on a yearly basis, staff found that SLR @ Big Trees does not attain bacterial water quality objectives (14% exceedence over the course of a year). Exceedences occurred in Feb., March, April, May, Jul., Nov. and Dec. 2005. Although the site exceeds the 400 MPN more than 10% of the time, we see that the numbers are very similar to the previous year. The highest exceedence in 2005 was lower than in 2004 and the geometric means are very similar both years. Therefore, it appears that the water quality is very similar in 2004 as compared to 2005. Even though this station exceeds the 10% of 400 MPN during the year 2005, staff concludes that the number of exceedences are still fairly low and the concentrations that do exceed the 400 MPN are not extremely elevated.

SLR @ Sycamore Grove (022)	Data collection time period	
	Jan. 2004 – Feb. 2005	Feb. 2005 – Jan. 2006
Total number of samples	75	57
Total samples that exceed 400 MPN/100 mL	4	5
% exceedence of 400 MPN	5%	9%
Highest exceedence	2000	2140
Geometric mean of all samples	61	71

Comparing the bacterial concentrations on a yearly basis, staff found that SLR @ Sycamore Grove is still attaining bacterial water quality objectives. However, if we look at the data month by month, we see that there were exceedences of the 400 MPN objective in Feb. through May, and December 2005. Comparing the yearly geometric mean with the previous year (Jan. 2004 – Feb. 2005), we see that the numbers are very similar. Therefore, it appears that the water quality is very similar in 2004 as compared to 2005. Even though there were some exceedences, staff concludes that they were low in frequency and in concentration.

Past analysis (2000 –2003): According to data taken by the County of Santa Cruz from 2000 – 2003, portions of the San Lorenzo River rarely[2] exceed bacterial water quality objectives for contact recreation while some sections of the River fully attain standards.

While there are certain sampling stations that exceed the bacterial water quality objective at various times throughout the year, the exceedences are minimal in both frequency and/or concentration. Analyzing sampling sites from the upper most portions of the watershed to the lower part of the watershed, we see that standards begin to be exceeded at the confluence of Two Bar Creek. There does not seem to be any impairment above this point. Therefore, we can clarify the listing of the San Lorenzo River to begin at Two Bar Creek. South of this point, as shown in Table 1, the sampling stations vary between not exceeding standards at all and rarely exceeding standards. The listing is further clarified to stop just above the confluence with Branciforte Creek (just southeast/downstream of the sampling site SLR @ Sycamore Grove). Downstream of this site, the waterbody is referred to as San Lorenzo River Estuary and will be addressed under the 303(d) listing for San Lorenzo River Estuary (see San Lorenzo River Estuary Project Plan).

[2] This statement means that water quality objectives have generally been attained, but a low frequency (no more than 20% exceedence) OR a low concentration (no more than 2000 MPN, most were lower than 1000 MPN) of exceedences was observed.

Table 1: Sampling stations in the San Lorenzo River (SLR) watershed listed from the upper watershed, to the lower watershed where the river drains into the Pacific Ocean. Data is from 2000 to Jan. 2004.

Station Name	Attains standards	Rarely exceeds standards[1]	Exceeds standards
SLR @ Waterman Gap	X		
SLR @ Two Bar Cr. (this site is above the confluence of SLR with Two Bar Creek)		X	
Two Bar Cr. @ SLR			X
SLR @ River St		X	
SLR @ Pacific Ave., Brookdale	X		
SLR Above Love Cr		X	
SLR @ Highlands Park	X		
SLR @ Big Trees		X	
SLR @ Sycamore Grove	X		

[1] – This statement means that water quality objectives have generally been attained, but a low frequency (no more than 20% exceedence) OR a low concentration (no more than 2000 MPN, most were lower than 1000 MPN) of exceedences was observed.

Preliminary source analysis: The County has DNA data for portions of the San Lorenzo River funded by an EPA drinking water contract.

Taken from, "DRAFT[3] Turbidity and Pathogen Control Efforts In the San Lorenzo River Watershed, Santa Cruz County, California." November 2004 (Located under S:\TMDLs & Watershed Assessment\TMDL and Related Projects- Region 3\San Lorenzo River\Bacteria\0 Work In Progress\draft report from SC County source tracking):

> Both the absolute amount and the relative amount of human contribution (21%) to fecal contamination is significantly diminished upstream of the water supply diversions near Sycamore Grove (200 yards upstream from Tait Street) and Big Trees (just below Felton Diversion Dam). The combined contribution from birds, wildlife and rodents is relatively high at 45-49%. Horse and dogs are also a significant source at Felton where a large stable is located just upstream from the intake. The moderate contribution from humans suggests that wastewater management programs are relatively effective at minimizing sewage discharge to the River, but that ongoing work is needed. The human sewage contribution is less in areas served by septic systems than downstream urban areas served by sewers. In the years since 1986, when the wastewater management program began, the observed septic failure rate has dropped from 18% to 1.5 %.

While there is some human and domestic animal contribution, the contribution is not that high compared to wildlife and rodents. Additionally, since the wastewater management programs inception, fecal coliform levels seem to be on the decline.

Revised Problem Hypothesis: San Lorenzo River rarely exceeds bacterial water quality objectives based on data Santa Cruz County collected from Feb. 2005 – Jan. 2006. The San Lorenzo River is defined as upstream of the Highway 1 Bridge (this is one mile downstream from

[3] Should check with John Ricker before citing this report definitively since it is still in draft form. There should be a final report by this time (May 24, 2006).

SLR @ Sycamore Grove sampling site). Since San Lorenzo Rive rarely exceeds bacterial water quality objectives in the last 11 years (1995 – 2005) and only occasionally exceeded bacterial water quality objectives between Feb. 2005 and Jan. 2006, staff offers the following recommendation:

- **San Lorenzo River should be designated a low priority. Request data from Santa Cruz from Feb. 2006 – Feb. 2007 and see what the data shows.**

It would be nice to delist this waterbody for pathogens. However, since the most recent sampling (Feb. 2005 – Jan. 2006) indicated that there are exceedences of the water quality objective for bacteria, it would be difficult to delist, even though the exceeding concentrations are so low. If concentrations of bacteria continue to exceed water quality objectives in the next couple of years (2006-2008 or 2009), we will reconsider investigating sources and correcting impairment if necessary.